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Please find below a communication from the EXAMINER in charge of this application.

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UNITED STATES DEPARTMENT OF COMMERCE
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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Paper No. 14
DEC 5 1996

Serial Number: 08/227,247
Filing Date: 4/13/94
Appellant(s): Vanderwende et al.

William Y. Conwell, Reg. No. 31,943
For Appellant

EXAMINER'S ANSWER

This is in response to appellant's brief on appeal filed
5/16/96.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of claims.

The statement of the status of claims contained in the brief is correct.

(4) *Status of Amendments After Final.*

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) *Summary of invention.*

The summary of invention contained in the brief is correct.

(6) *Issues.*

The appellant's statement of the issues in the brief is correct.

(7) *Grouping of claims.*

Appellant's brief includes a statement that claims 20-21, 24-30, 33-43 and 45 do not stand or fall together and provides reasons as set forth in 37 C.F.R. § 1.192(c)(5) and (c)(6).

(8) *Claims appealed.*

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) *Prior Art of record.*

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

Lenat et al. "Building Large Knowledge-Based Systems", Addison-Wesley Publishing Company, Inc., 1989, pp. 1-372.

(10) New prior art.

No new prior art has been applied in this examiner's answer.

(11) Grounds of rejection.

The following ground(s) of rejection are applicable to the appealed claims.

The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. § 103, the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 C.F.R. § 1.56 to point out

the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of potential 35 U.S.C. § 102(f) or (g) prior art under 35 U.S.C. § 103.

Claims 20-21, 24-30, 33-43 and 45 are rejected under 35 U.S.C. § 103 as being unpatentable over applicant's admitted prior art in view of the Lenat et al. book, "Building Large Knowledge-Based Systems".

Appellant's admitted prior art teach the parsing and extraction of semantic relation structures including a headword, a relation and a value from dictionaries and their storage in association with the headword for use as a knowledge base for natural language processing. Note page 2, lines 9+, and page 10, lines 8+, of the instant specification. Appellant's admitted prior art fails to specifically teach the inversion of the semantic relation structure and its storage in association with the value. However, Lenat et al. specifically teach that, in the construction of a knowledge base, inverses to the entered relationships are automatically formed and stored in association with the "value" of the relation. Lenat also specifically teaches that this provides an accessing advantage when using the knowledge base and provides the possible introduction of additional inferences. See section 3.3.1 on pages 83-84 of Lenat. Thus, it would have been obvious to those of ordinary skill in the art to modify the teachings of the admitted prior

art to include the generation of inversions for the accessing advantage taught by Lenat.

Concerning the recited repetition of the method, presumably with the augmented knowledge base, Lenat specifically teaches, as mentioned above, that the inversion might cause other inferences. This indicates that the knowledge base has been expanded as a result of the inversion. Thus, it would have been obvious to those of ordinary skill in the art to repeat the processing of the original text for the obvious benefit of the efficient use of resources resulting from the extraction of any additional useful information from the text due to the development of an expanded knowledge base. With respect to the recited extraction of different sets of semantic relations, since the first pass of the method already stores any found relations and their inverses, it would have been obvious to those of ordinary skill in the art that the relations already found do not need to be extracted and processed again in order to obviously save computational time and expense.

Appellant has argued that the prior Office action did not provide a "suggestion in the cited art leading to each of the combinations claimed". However, as clearly mentioned on page 8 of the Office action, Lenat teaches that inversion provides an accessing advantage. Moreover, appellant's requirement that the suggestion be provided in the "cited art" is inaccurate. It is well settled that the prior art may be properly evaluated for

reasonable inferences which one skilled in the art would draw therefrom, not just there express teachings. Further, it has been established that the conclusion of obviousness may be made from common knowledge and common sense of a person of ordinary skill in the art without any specific hint or suggestion in a particular reference. Thus, even if Lenat lacked a teaching of why inversions were advantageous, these advantages would have been obvious and readily apparent to those of ordinary skill in the art in light of the common knowledge and common sense of those of ordinary skill in the art. Also, while appellant argues that the discussion of advantages is not sufficient rationale, the acknowledgement of advantages by those in the art certainly provides strong incentive and motivation to those in the art to obtain those advantages. As these advantages are explicitly expressed in Lenat, it is not seen where impermissible hindsight is used.

Appellant has attempted to characterize Lenat as teaching away from the combination claimed. However, the citation of Lenat used as support for this argument discussed failures in "the early seventies" and indicated that automation would not be shunned when "natural language understanding begins to be a more effective way of further enlarging" the knowledge base. Thus, Lenat is not discarding the automated approach as asserted by appellant. As natural language understanding has certainly advanced since the date of publication of Lenat, Lenat's

assumptions concerning the abilities in the art cannot be taken as the last word. With respect to appellant's assertion that Lenat disparaged encyclopedias as knowledge bases, it is not seen where the claims recite the use of encyclopedias.

(12) New ground of rejection.

This Examiner's Answer does not contain any new ground of rejection.

(13) Response to argument.

Initially, applicant attempts to cloud the picture of what is taught in the admitted prior art by asserting that it represents a group of diverse research efforts that would not have been obvious to collect. However, as clearly indicated in the specification, and further evidenced from even a brief inspection of the documents submitted that correspond to the work described in the specification, this grouping of prior art builds on itself. As described on page 2, lines 14-20, Chodorow et al. automatically extracted genus terms for nouns and verbs from an electronic dictionary, then Markowitz et al. "expanded this general approach" by attempting to discover syntactic or lexical patterns that express semantic relationships. Markowitz is clearly aware of the work of Chodorow et al. and cites their work in the "Introduction" and "References" sections of that work. Further on line 20, Calzolari uses the same procedure, "string

matching", used by Chodorow et al. to extract semantic information from the text of dictionary definitions.

Next, on lines 24+ of page 2, it is clearly stated that "semantic information has been extracted from on-line dictionaries in a two step procedure, first parsing the dictionary text (the definition and/or example sentences), and then applying patterns to this syntactic information in order to improve the accuracy of the identification of semantic information". This clearly establishes that appellant's admitted prior art teaches the parsing and extraction of semantic relationships from dictionaries. The work specifically identified for this teaching in the specification is that of Jensen and Binot (1987), which itself clearly cites the work of Markowitz. The specification then goes on to mention "related work" to that of Jensen and Binot, including that of "Klavans et al (1990), Ravin (1990), Verlardi et al. (1991) and Montemagni and Venderwende (1992)". This is further built on by the statement on page 3, line 9-12 that additional works have taught that "dictionary entries can be effectively analyzed by a parser designed for broad-coverage text analysis". While appellant now wishes to paint the prior art as fragmentary and diverse, a clear progression and connection is described, and the grouping thereof is apparent from at least the documents themselves.

Finally, on pages 8-9 of the specification, three steps are described. First, a text segment is parsed to obtain a logical

form. Second, a semantic relation structure is then extracted from the logical form including the use of headword, semantic relation, and a value. Third, the semantic relation structure is then stored in association with the headword as part of a lexical knowledge database. The specification then goes on to state that "these steps, per se, are well known in the art, being found in many other NLP analysis systems". While the specification offers the caveat of "albeit not in the context of extracting semantic relations from the logical form of definitions in on-line dictionaries" on which appellant relies heavily, the key portion of the caveat must be "of definitions in on-line dictionaries" as "extracting semantic relations from a logical form" is a clear part of the steps admitted to being prior art.

However, part of the admittedly prior art first step indicates that the parsed text segment "could be a dictionary definition", either the sense or the example sentence, and mentions the use of an on-line dictionary. See page 8 lines 5-7. As parsing produces the "logical form" from which extraction is performed, the clear description of these admittedly prior art steps contradicts this caveat. Moreover, as indicated above, page 2 of the specification on lines 24-27 specifically describes prior art parsing of dictionary text, either the definition and/or the example sentences, for the expressed purpose of extraction of semantic information. Such parsing of dictionary entries is again mentioned on page 3 lines 9-12. Given the

preponderance of prior art parsing operations on dictionary definitions and the use of dictionary definitions in the first step on page 8 identified as prior art, the caveat relied on by appellant is not persuasive. As a result, it is not seen where "diverse" art is pieced together using hindsight as asserted as the teachings identified in the specification form a clear chain or progression that suggests its combination.

In any event, even if the caveat is given credibility in light of its contradictory nature, the key portion of the caveat, "of definitions in on-line dictionaries", does not appear in any of the rejected claims. The claims merely operate on a collection of text segments or a natural language corpus, not on dictionary definitions. As a result, even with the caveat in place, the body of admitted prior art is still effective in rejecting claims that merely broadly call for operating on just "a segment of text" and not "definitions in on-line dictionaries".

With respect to the Lenat et al. reference, appellant goes to great lengths to demonstrate that Lenat rejected the automated approach to building a database through natural language analysis. Whether or not this is so is irrelevant in light of the fact that many other people in the art have not rejected this approach. In other words, the question is not "what would have been obvious to Lenat", but what would have been obvious to those of ordinary skill in the art. Lenat's view that there is "no

free lunch" did not apparently stop the numerous individuals (for example, Chodorow et al., Markowitz et al., Calzolari, Jensen and Binot, Klavans et al., Ravin, Verlardi et al.) mentioned in the applied prior art from continuing down the path of automation. While a showing that the prior art taught away from the claimed invention can be used to overcome a rejection under 35 USC 103, such a showing has not been persuasively made here in light of the clear tradition of work in the art towards the automation of the extraction of semantic relationships from text.

With regard to the use of inversion in Lenat, appellant argues that Lenat failed to recognize the power of this technique "when applied in conjunction with the other elements of the presently claimed combinations". However, this assertion would require that Lenat *anticipate* the claimed invention which is not the manner in which Lenat is applied. As appellant agrees, Lenat relied on inversion to augment his knowledge base, a desirable advantage. This teaching in the Lenat provides incentive for those in the art to make obvious modifications.

Concerning appellant's assertion that there is no "reasonable expectation of success", this focuses in myopically on the teachings of Lenat and ignores the other teachings by those in the art toward automation. With respect to appellant's arguments concerning the treatment of the "gist" of the invention, this does not give fair credit to what is admitted to be prior art, which was addressed above. While appellant

presents a laundry list of recitations that are asserted to have been ignored by the examiner, these are part of the admitted prior art that the examiner pointed to in the prosecution history. It was assumed appellant had read and understood the content of his own specification.

The "at least one element in addition to a headword, a semantic relation, and a value", given the broad nature of the term "element" is found on page 8 in prior art step 2 in the discussion of rich tree structures. The "broad coverage parser", the "applying a first set of rules to a segment of text to yield a syntactic structure corresponding thereto" and the "applying a second set of rules to the syntactic structure to produce the logical form" are found in prior art step 1 on page 8. The "applying a third set of rules to the logical forms to obtain semantic relation structures" is found in prior art step 2 of page 8. String searching is found on page 2 lines 14-22 of the instant specification in describing both Chodorow and Calzolari. With respect to the specific semantic relations used, appellant has not disclosed the discovery of new semantic relations and thus, the use of standard semantic relations would have been obvious to those of ordinary skill in the art. With respect to the recited extraction of different sets of semantic relations, since the first pass of the method already stores any found relations and their inverses, it would have been obvious to those of ordinary skill in the art that the relations already found do

not need to be extracted and processed again in order to obviously save computational time and expense.

With respect to the concept that inversion can introduce additional inferences in Lenat, appellant challenges the examiner's assertion that this is specifically taught therein. Appellant asserts that section 3.3.1 on pages 83-84 of Lenat merely notes that adding inverses to the knowledge base speeds searching and facilitates removal of unwanted entries. However, note the second line from the bottom on page 83 of Lenat which states, in response to the formation of an inversion, "This in turn might cause other inferences, of course". It is not clear how this can be called "non-existent" by appellant.

Appellant goes on to argue the iterative processing recited, but this has been previously addressed. As mentioned in the Office action mailed 1/19/95, "Concerning the recited repetition of the method, presumably with the augmented knowledge base, Lenat specifically teaches, as mentioned above, that the inversion might cause other inferences. This indicates that the knowledge base has been expanded as a result of the inversion. Thus, it would have been obvious to those of ordinary skill in the art to repeat the processing of the original text for the obvious benefit of the efficient use of resources resulting from the extraction of any additional useful information from the text due to the development of an expanded knowledge base". While appellant also wants to take issue with the lack of machine

parsing in Lenat, appellant is treating Lenat in a vacuum away from the remainder of the prior art applied. Nonobviousness cannot be established by attacking the references used in combination individually. See In re Merck & Co., 231 USPQ 375 (CAFC 1986).

Appellant then attacks the examiner's use of "common knowledge and common sense" for a rationale leading an artisan to modify references. While appellant attempts to assert that this approach "is waning in popularity", appellant has not provided any decisions overturning the body of law that supports the examiner's position. While appellant proffers the Rijckaert decision, appellant has misread it. This decision addresses assumptions that were somehow asserted to be inherent in the prior art, but were not found, such that a prima facie case of obviousness was not established. This does not address the issue of motivation from common knowledge and common sense as argued, and in any event, the examiner is not relying on some missing "inherent" teaching. Moreover, in addition to Bozek cited by appellant, it is stated in the fairly recent decision, In re Fine, 5 USPQ 2d 1598 (CAFC 1988), that the PTO can satisfy the burden of establishing a prima facie case of obviousness by "showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references". Further, it has been held that the skilled

artisan is presumed to know something more about the art than only what is disclosed in the applied references (In re Jacoby, 135 USPQ 317) and that every reference relies to some extent on knowledge of persons skilled in the art to complement that which is disclosed therein (In re Bode, 193 USPQ 12). Thus, it is not seen where the common knowledge and common sense of those in the art can be discounted as desired by appellant, and hence the motivations provided by the examiner in the previous Office actions retain their validity. While appellant wraps up this argument by again asserting the lack of automation in Lenat, this again treats Lenat in a vacuum away from the admitted prior art.

Finally, with respect to the notes on the independent patentability of claims, the use of the argued natural language parser has been treated above. With respect to the use of a computer to identify text segments, as parsers are notoriously well known to find and operate on units of text such as sentences within a corpus such identification of text segments must be included with the use of a parser.

(14) Conclusion.

Appellant has attempted to alter the perception of the admitted prior art, but the admitted prior art itself presents a clear picture and is directly relevant and applicable to the rejected claims. Appellant also attempts to recast the question of obviousness into "what would have been obvious to Lenat",

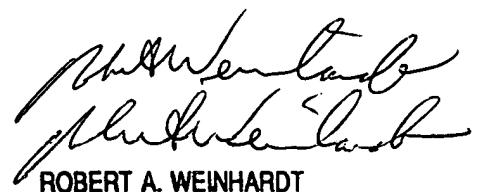
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instead of considering the extensive teachings of automation found in the prior art. Finally, appellant argues that rejections for claimed limitations were not articulated, but this fails to consider the comprehensive coverage of the admitted prior art.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,



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September 2, 1996

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